

WHAT IS CLAIMED IS:

1. A recording apparatus comprising:

5 a recording medium fixing member having a plurality of suction ports on the fixed surface to fix the recording medium; an adhering roller which can contact with or separate from the recording medium fixing member and which cleans the fixed surface; a flexible plate which is attached onto the fixed surface of the recording medium fixing member and whose contact surface with the  
10 recording medium is cleaned by the adhering roller; and a suction apparatus for recording medium fixing which sucks the air from the suction ports of the recording medium fixing member and sucks and fixes the flexible plate and the recording medium onto the fixed surface.

15 2. A recording apparatus according to Claim 1, wherein the adhesive strength of the adhering roller is 10-65 Hpa.

3. A recording apparatus according to Claim 1, the hardness of the  
20 adhering roller 10-70°.

4. A recording apparatus according to Claim 1, wherein at least  
either one of the recording medium fixing member or the adhering roller which are under a contacting condition with each other, is driven, and both of them are synchronously rotated.

25 5. A foreign material removal method of the recording medium which is provided with: a recording medium fixing member having a plurality of suction ports on the fixed surface of the recording medium; an adhering roller

which cleans the fixed surface of a recording medium fixing member; a flexible plate which is attached onto the fixed surface of the recording medium fixing member; and a suction apparatus for recording medium fixing which sucks the air from the suction port of the recording medium fixing member and sucks and  
5 fixes the flexible plate and the recording medium onto the recording medium fixing member, wherein the flexible plate attached onto the fixed surface of the recording medium fixing member is cleaned by the adhering roller.

6. A foreign material removal method of the recording medium which  
10 is provided with: a recording medium fixing member having a plurality of suction ports on the fixed surface of the recording medium; a adhering roller which cleans the fixed surface of a recording medium fixing member; a flexible plate which is attached onto the fixed surface of the recording medium fixing member; and a suction apparatus for recording medium fixing which sucks the  
15 air from the suction port of the recording medium fixing member and fixes by suction the flexible plate and the recording medium onto the recording medium fixing member, wherein the flexible plate which is attached onto the fixed surface of the recording medium fixing member, and sucked and fixed onto the fixed surface by the suction apparatus for recording medium fixing, is cleaned  
20 by the adhering roller.

7. A foreign material removal method of the recording medium which is provided with: a recording medium fixing member having a plurality of suction ports on the fixed surface of the recording medium; a adhering roller  
25 which cleans the fixed surface of a recording medium fixing member; a flexible plate which is attached onto the fixed surface of the recording medium fixing member; and a suction apparatus for recording medium fixing which sucks the air from the suction port of the recording medium fixing member and sucks and

fixes the flexible plate and the recording medium onto the recording medium fixing member, wherein, before the flexible member is attached onto the fixed surface of the recording medium fixing member, the fixed surface is cleaned by the adhering roller.

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8. A recording apparatus which is provided with a recording medium conveying means which holds a recording medium and conveys it from a recording medium supplying section to a recording section, wherein the apparatus is provided with a rotatable adhesive roller, and the adhesive roller comes into contact with a conveying roller which is a recording medium conveying means, and is rotated before the recording medium is conveyed corresponding to turning-on of a apparatus power supply, or recording start command.

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9. A recording apparatus according to Claim 8, wherein the conveying roller and the adhesive roller are provided in the condition that they are always in contact with each other.

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10. A recording apparatus according to Claim 8, wherein one of the conveying roller and the adhesive roller is provided so that it can be moved and brought into contact with the other.

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11. A recording apparatus according to Claim 10, wherein the adhesive roller is rotated by driving or being driven.

12. A recording apparatus according to Claim 8, wherein the conveying rollers are formed of one pair of nip rollers, and the adhesive rollers are provided respectively corresponding to the upper conveying roller and lower

conveying roller.

13. A recording apparatus according to Claim 8, wherein the adhesive roller is wound by a rubber material or an adhesive material whose adhesive  
5 strength is not weaker than the conveying roller.

14. A recording apparatus according to any one of Claim 8, wherein the adhesive roller is formed of the rubber whose hardness is not larger than the conveying roller.  
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15. A recording apparatus according to Claim 8, wherein the adhesive roller is arranged at the position in the vicinity of the outside of the apparatus in the apparatus, and it is provided so that it can be easily cleaned from the outside of the apparatus or its surface can be peeled off by one round portion and renewed.  
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16. A recording apparatus which is provided with the recording medium conveying means which holds the recording medium and conveys it from the recording medium supplying section to the recording section, wherein  
20 the recording section has a recording head for conducting the laser exposure, and an adhesive roller which is brought into contact with the conveying roller which is the recording medium conveying means, and rotated before the recording head scans on the transfer sheet of the recording medium formed of a plurality of transfer sheets successively laminated so that the toner layer is  
25 superimposed on the image receiving sheet and the image receiving layer of the image receiving sheet and conducts the laser exposure.

17. A foreign material removal method in a recording apparatus

which is provided with the recording medium conveying means which holds the recording medium and conveys it from the recording medium supplying section to the recording section, wherein the foreign material adhered onto the surface of the conveying roller is removed by using the adhesive roller which is brought  
5 into contact with the conveying roller which is the recording medium conveying means and rotated before the conveyance of the recording medium corresponding to the turning-on of the power supply of the apparatus or recording start command.

10 18. A foreign material removal method according to Claim 17, wherein, by using the adhesive roller which is provided in the condition that it is always in contact with the conveying roller, the foreign material adhered onto the surface of the conveying roller is transferred onto the adhesive roller side and removed.

15 19. A foreign material removal method according to Claim 17, wherein, by using the adhesive roller which is moved and rotated so that it can be in contact with the conveying roller, the foreign material adhered onto the surface of the conveying roller is transferred onto the adhesive roller side and removed.

20 20. A foreign material removal method according to Claim 18, wherein the adhesive roller which is rotated by driving or being driven is used.

25 21. A foreign material removal method according to Claim 16 , wherein the adhesive roller around which the rubber material or adhesive material whose adhesive strength is not weaker than the conveying roller is wound, is used.

22. A foreign material removal method according to Claim 17 , wherein the adhesive roller formed of the rubber whose hardness is not larger than the conveying roller is used.

5 23. A foreign material removal method according to Claim 17 , wherein the adhesive roller which is provided at the position in the vicinity of the apparatus outside in the apparatus, and is provided so that it can be cleaned or its surface is peeled off by one round portion and renewed from the outside of the apparatus, is used.

10 24. A recording apparatus which is provided with a recording medium supply section, recording medium conveying section and recording section, and at least in any one of respective sections, an adhesive roller for foreign material removal using an adhesive material is provided, wherein the adhesive roller is  
15 a crown shape formed in such a manner that the diameter of the central portion is not smaller than the diameter of both end portions in the axial direction of the roller main body.

20 25. A recording apparatus according to Claim 24, wherein the crown shape is a shape in which the difference between the diameter of the both end portions in the axial direction and the diameter of the central portion is not smaller than 0.1 mm, and not larger than 2 mm.

25 26. A recording apparatus according to Claim 24, wherein, when the diameter of the both end portions in the axial direction is d, and the diameter of the central portion is D, the crown shape is a shape set in the range of  $1.002 \leq D/d \leq 1.11$ .

27. A recording apparatus according to Claim 24, wherein, when the diameter of the both end portions in the axial direction is d, the diameter of the central portion is D, and the axial length of the roller main body is L, the crown shape is a shape set in the range of  $0.0001 \leq (D - d)/L \leq 0.005$ .

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28. A recording apparatus according to Claim 24, wherein the recording medium supply section has a supply tray to directly conduct the hand paper feed of the recording medium.

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29. A recording apparatus according to Claim 24, wherein the recording medium supply section is loaded with a recording medium cassette in which a plurality of recording media are previously laminated and accommodated in a predetermined order, and the recording medium is supplied from the loaded recording medium cassette.

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30. A recording apparatus according to Claim 24, wherein the recording medium supply section has an opening portion to directly supply the recording medium to the recording section.

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31. A recording apparatus according to Claim 24, wherein the adhesive material includes  $\text{TiO}_x$  (titanium oxide).

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32. A recording apparatus according to Claim 24, wherein the adhesive material includes  $\text{TiO}_x$  (titanium oxide), and does not include Ba (barium).

33. A recording apparatus according to Claim 24, wherein the adhesive material includes hydrocarbon compound having the functional group

of C-O or Si-O.

34. A recording apparatus according to Claim 24, wherein the recording section comprises a rotating drum for the recording which is axially supported rotatably in the main scanning direction, and a recording head which is movably attached in the sub scanning direction almost perpendicular to the main scanning direction.

35. A foreign material removal method of the recording apparatus which has the recording medium supply section, recording medium conveying section, and recording section, and at least in any one of respective sections, an adhesive roller for the foreign material removal using the adhesive material is arranged, wherein the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller of the crown shape formed in such a manner that the diameter of the central portion is not smaller than the diameter of both end portions in the axial direction of the roller main body.

36. A foreign material removal method according to Claim 35, wherein the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller in which the difference between the diameter of both end portions in the axial direction and the diameter of the central portion is not smaller than 0.1 mm, and not larger than 2 mm.

37. A foreign material removal method according to Claim 35, wherein, when the diameter of both end portions in the axial direction is  $d$ , and the diameter of the central portion is  $D$ , the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive



roller having the shape set in the range of  $1.002 \leq D/d \leq 1.11$ .

38. A foreign material removal method according to Claim 35, wherein, when the diameter of the both end portions in the axial direction is  $d$ , the diameter of the central portion is  $D$ , and the axial length of the roller main body is  $L$ , the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller having the shape set in the range of  $0.0001 \leq (D - d)/L \leq 0.005$ .

39. A foreign material removal method according to Claim 35, wherein the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller using the adhesive material including  $\text{TiO}_x$  (titanium oxide).

40. A foreign material removal method according to Claim 35, wherein the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller using the adhesive material including  $\text{TiO}_x$  (titanium oxide) and not including Ba (barium).

41. A foreign material removal method according to Claim 35, wherein the foreign material of the recording medium or inside the recording apparatus is removed by using the adhesive roller using the adhesive material including the hydrocarbon compound having the functional group of C-O or Si-O.

42. A foreign material removal method according to Claim 35, wherein the recording section comprises the rotating drum for the recording which is axially supported rotatably, and the recording head attached movably in the straight advance, and the foreign material of the recording medium or inside

the recording apparatus is removed for the recording apparatus in which the rotating drum for the recording is rotated in the main scanning direction at high speed, and the recording head is moved in the sub scanning direction perpendicular to the main scanning direction at a low speed.

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43. A cleaning method of a recording medium, wherein while a cleaning roller having the adhesion property is brought into contact with the recording medium sucked and fixed on the surface of a recording medium fixing member, a cleaning roller is relatively moved to a recording medium fixing member, and the foreign material on the recording medium surface is removed, wherein the cleaning is conducted from almost central portion of the relative movement direction of the recording medium fixed onto the recording medium fixing member to the one relative movement direction end portion, and after that, the cleaning is conducted from almost central portion of the relative movement direction of the recording medium to the other relative movement direction end portion.

44.. A cleaning method of a recording medium wherein, while a cleaning roller having the adhesion property is brought into contact with the recording medium sucked and fixed on the surface of a recording medium fixing member, a cleaning roller is relatively moved to a recording medium fixing member, and the foreign material on the recording medium surface is removed, wherein the cleaning roller is relatively moved while it is brought into contact with almost central portion of the relative movement direction of the recording medium, and after it passes the relative movement direction end portion of the recording medium, this cleaning roller is separated from the recording medium fixing member surface.

45. A cleaning method of a recording medium wherein, while a cleaning roller having the adhesion property is brought into contact with the recording medium sucked and fixed on the surface of a recording medium fixing member, a cleaning roller is relatively moved to a recording medium fixing member, and the foreign material on the recording medium surface is removed, wherein the cleaning roller is relatively moved while the cleaning roller is brought into contact with the almost central portion of the relative movement direction of the recording medium fixed onto the recording medium fixing member, and after the cleaning roller passes one relative movement direction end portion of the recording medium, the cleaning roller is separated from the recording medium fixing member surface, and after that, the cleaning roller is relatively moved in the reversal direction to the movement direction while the cleaning roller is brought into contact with the almost central portion of the relative movement direction of the recording medium again, and after the cleaning roller passes the other relative movement direction end portion of the recording medium, the cleaning roller is separated from the recording medium fixing member surface.

46. A cleaning method of the recording medium according to Claim 43, wherein the almost central portion of the relative movement direction of the recording medium includes the central position of the relative movement direction of the recording medium and is positioned within the range of 50 % of the recording medium relative movement direction length.

47. A cleaning method of the recording medium according to Claim 43, wherein the almost central portion of the relative movement direction of the recording medium is positioned within the range of  $\pm 25$  % of the recording medium relative movement direction length centering around the central

position of the relative movement direction of the recording medium.

48. A cleaning method of the recording medium according to Claim 43, wherein the first cleaning area from the almost central portion of the relative movement direction of the recording medium to the one relative movement direction end portion is overlapped with the second cleaning area from the almost central portion of the relative movement direction to the other relative movement direction end portion.

49. A cleaning method of the recording medium according to Claim 48, wherein the overlap amount of the first cleaning area with the second cleaning area is not larger than 45 % of the recording medium relative movement direction length.

50. A recording apparatus in which the recording corresponding to the character image data is conducted on the recording medium sucked and fixed onto the surface of the recording medium fixing member, wherein a cleaning roller having the adhesion property provided oppositely to the recording medium fixing member in such a manner that it can be contacted with or separated from the fixed recording medium, and a control section which controls the contact and separation motion of the cleaning roller and the relative movement motion of the recording medium fixing member and the cleaning roller according to the cleaning method of the recording medium of Claim 43, are provided.

51. A recording apparatus according to Claim 50, wherein the recording medium fixing member is a rotating drum for the recording which is rotated with the recording medium fixed on the peripheral surface thereof.

52. An adhesive roller which is provided in a recording apparatus, and has: a movement section which conducts the pressing onto the surface and separation from the surface to remove a foreign material adhered onto the surface of a recording medium supply section, recording medium conveyance section, recording section in the recording apparatus, and recording medium during the conveyance; a core portion of the cylindrical shape; and an adhesive member attached onto the core portion, wherein, at the both end portions of the adhesive roller, in order to regulate the compression deformation of the adhesive member when the adhesive roller is pressed onto the surface, regulation disks which have a diameter not larger than the outer diameter of the adhesive member, and which are formed of the material not softer than the adhesive member, are provided.

53. An adhesive roller according, wherein the regulation disk is integrally molded with the core portion of the adhesive roller.

54. An adhesive roller according, wherein the regulation disk is separately molded from the core portion of the adhesive roller.

55. An adhesive roller according to Claim 52, wherein regulation disks are respectively provided outside both end surfaces in the axial direction of the core portion of the adhesive roller, and movement sections are respectively provided outside the regulation disks.

56. An adhesive roller according to Claim 52, wherein drive sections are respectively provided outside both end surfaces in the axial direction of the core portion of the adhesive roller, and regulation disks are respectively

provided outside the drive sections.

57. An adhesive roller according to Claim 52, wherein the diameter of the regulation disk is not larger than the outer diameter of the adhesive member of the adhesive roller by 0.1 mm-2 mm.

58. An adhesive roller according to Claim 52, wherein, when the length from the center of the rotating axis of the adhesive roller to the outer surface of the adhesive member is R, radius of the regulation disk is r, and thickness of the adhesive member is t, the relational expression shown by  $0.05 \leq (R-r)/t \leq 0.5$  is satisfied.

59. An adhesive roller according to Claim 52, wherein the adhesive member attached onto the cylindrical core portion is an elastic member or a rubber material.

60. A foreign material removal method to remove the foreign material adhered onto the surface by an adhesive roller which is provided in a recording apparatus, and has: a movement section which conducts the pressing onto the surface and separation from the surface to remove a foreign material adhered onto the surface of a recording medium supply section, recording medium conveyance section, recording section in the recording apparatus, and recording medium during the conveyance; a core portion of the cylindrical shape; and an adhesive member attached onto the core portion, wherein, at the both end portions of the adhesive roller, regulation disks which have a diameter not larger than the outer diameter of the adhesive member, and which are formed of the material not softer than the adhesive member, are provided, and when the adhesive roller is pressed onto the surface, the compression deformation

